

Breakthrough Reveals Potential FDA-Approved Parkinson's Treatment

Description

Recent investigations have elucidated the mechanisms by which a cell surface protein known as A β 1 facilitates the propagation of neurotoxic materials associated with Parkinson's disease from one neuron to another within the cerebral milieu.

Encouragingly, an FDA-sanctioned oncology medication that targets a distinct protein, [Lag3](#)—which exhibits a notable interaction with [A \$\beta\$ 1](#)—has been shown to inhibit this intercellular dissemination in experimental murine models, indicating that a viable therapeutic avenue may already be available.

In a [study published in the preceding year](#), a multinational consortium of researchers articulates the intricate interplay between these two proteins, which is integral to the uptake of deleterious [alpha-synuclein](#) aggregates by neuronal cells.

Neuroscientist Xiaobo Mao from Johns Hopkins University remarked in June, "The elucidation of the A β 1-Lag3 interaction provides a novel framework for comprehending how alpha-synuclein contributes to the pathogenesis of Parkinson's disease." He further emphasized that pharmacological targeting of this interaction could potentially decelerate the progression of both Parkinson's and other neurodegenerative disorders.

Globally, over [8.5 million individuals](#) are afflicted by Parkinson's disease, rendering it the second most prevalent neurodegenerative malady, following Alzheimer's. This progressive ailment, predominantly characterized by motor dysfunctions, is typically diagnosed post-manifestation of symptoms such as tremors, rigidity, and cognitive disturbances.

The degeneration of dopaminergic neurons in the [substantia nigra](#) underlies the symptomatic presentation of the disease, with the misfolding of alpha-synuclein implicated in the formation of toxic aggregates known as [Lewy bodies](#).

Furthermore, prior murine studies [have demonstrated](#) that Lag3's binding to alpha-synuclein accelerates the spread of Parkinsonian pathology within neurons. While the ablation of Lag3 substantially mitigates this process, it does not entirely inhibit it, suggesting that additional proteins may also participate in mediating the absorption of misfolded alpha-synuclein within the neuronal framework.

The most recent experiments, employing genetically engineered mice deficient in A β 1, Lag3, or both, revealed that, while A β 1 and Lag3 can each independently facilitate the cellular uptake of detrimental alpha-synuclein, their simultaneous presence markedly amplifies this assimilation process. A striking reduction—up to 90 percent—of harmful alpha-synuclein ingress was observed in neurons lacking both proteins, underscoring the essential role of A β 1.

The administration of the drug [nivolumab/relatlimab](#), a therapeutic for melanoma that contains an antibody targeting Lag3, corroborated the inhibition of A β 1-Lag3 interactions, effectively stymying the synthesis of pathological alpha-synuclein aggregates in neuronal cells.



At this juncture, the researchers intend to explore the efficacy of the Lag3 antibody in murine models of Parkinson's disease and Alzheimer's, the latter of which has also been highlighted as a potential avenue for targeted therapy according to [emerging research](#).

This pivotal research has been disseminated in [Nature Communications](#).

Note: An earlier iteration of this article was published in June 2024.

Vocabulary List:

1. **Elucidated** /ɪˈluː.sɪ.deɪ.tɪd/ (verb): Made something clear; explained.
2. **Intercellular** /ɪn.tərˈsel.jə.lər/ (adjective): Relating to or occurring between cells.
3. **Pathogenesis** /ˌpæθ.əʊˈdʒɛn.ɪ.sɪs/ (noun): The development of a disease or the process by which a disease develops.
4. **Degeneration** /dɪ.dʒɛn.əˈreɪ.jən/ (noun): The process of losing functional or structural integrity.
5. **Absorption** /əbˈzɔːr.pən/ (noun): The process by which one thing takes in or absorbs another.
6. **Therapeutic** /ˌθɛrəˈpiː.tɪk/ (adjective): Relating to the treatment of a disease or a medical condition.

Comprehension Questions

Multiple Choice

1. What is the cell surface protein that facilitates the propagation of neurotoxic materials associated with Parkinson's disease?

- Option: Atp1
- Option: Lag3
- Option: Alpha-synuclein
- Option: Nivolumab/relatlimab

2. Which protein has been shown to inhibit intercellular dissemination in experimental murine models related to Parkinson's disease?

- Option: Atp1
- Option: Lag3
- Option: Alpha-synuclein
- Option: Nivolumab/relatlimab



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3. What is the degeneration of dopaminergic neurons in the substantia nigra implicated in?
- Option: Lewy bodies formation
 - Option: Alpha-synuclein misfolding
 - Option: Alzheimer's disease
 - Option: Parkinsonian pathology
4. Which drug contains an antibody targeting Lag3 and inhibits Aplp1-Lag3 interactions?
- Option: Aplp1
 - Option: Lag3
 - Option: Alpha-synuclein
 - Option: Nivolumab/relatlimab
5. What did experiments on genetically engineered mice deficient in Aplp1 and Lag3 reveal?
- Option: Ablation of Lag3 inhibits assimilation process
 - Option: Simultaneous presence of Aplp1 and Lag3 reduces ingress by 90%
 - Option: Lack of Aplp1 reduces intercellular dissemination
 - Option: Aplp1 and Lag3 independently inhibit alpha-synuclein absorption
6. What does the research intend to explore the efficacy of in murine models of Parkinson's disease and Alzheimer's?
- Option: Aplp1-Lag3 interactions
 - Option: Alpha-synuclein aggregates
 - Option: Lag3 antibody
 - Option: Nivolumab/relatlimab activity

True-False

7. Lag3 is a cell surface protein implicated in the propagation of neurotoxic materials associated with Parkinson's disease.
8. Alpha-synuclein misfolding is not involved in the formation of Lewy bodies.
9. Administering nivolumab/relatlimab has no impact on the synthesis of pathological alpha-synuclein aggregates in neuronal cells.
10. Alpha-synuclein contributes to the pathogenesis of Alzheimer's disease as well.
11. The recent research on Parkinson's disease was disseminated in Journal of Neuroscience.



12. The research intends to explore targeted therapy for Huntington's disease.

Gap-Fill

13. According to the content, over _____ million individuals globally are afflicted by Parkinson's disease.

15. The administration of nivolumab/relatlimab, a therapeutic for melanoma, effectively stymies the synthesis of _____ in neuronal cells.

16. According to the content, the degeneration of _____ neurons in the substantia nigra underlies the symptomatic presentation of Parkinson's disease.

17. The most recent experiments showed that the simultaneous presence of Aplp1 and Lag3 markedly amplifies the assimilation process of detrimental _____.

18. The multinational consortium of researchers articulated the intricate interplay between Aplp1 and Lag3, which is integral to the uptake of deleterious _____ by neuronal cells.

Answer

Multiple Choice: 1. Aplp1 2. Lag3 3. Lewy bodies formation 4. Nivolumab/relatlimab 5. Simultaneous presence of Aplp1 and Lag3 reduces ingress by 90% 6. Lag3 antibody

True-False: 7. False 8. False 9. False 10. False 11. False 12. False

Gap-Fill: 13. 8.5 15. pathological alpha-synuclein aggregates 16. dopaminergic 17. alpha-synuclein 18. alpha-synuclein aggregates

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What term is used to describe something that has been explained in a clear and detailed manner?
Option: Absorption



- Option: Degeneration
- Option: Elucidated
- Option: Therapeutic

2. Which term refers to the origin and development of a disease?

- Option: Mitigating
- Option: Pathogenesis
- Option: Intercellular
- Option: Taxonomic

3. Which term means inspiring fear or respect through being impressively large powerful intense or capable?

- Option: Formidable
- Option: Ecological
- Option: Phenotypic
- Option: Modulate

4. Which term relates to the healing of a disease or the treatment of a disorder?

- Option: Intrinsic
- Option: Therapeutic
- Option: Delineate
- Option: Antisocial

5. What is the term used to describe a statistical analysis that combines the results of multiple scientific studies?

- Option: Meta-analysis
- Option: Prophylaxis
- Option: Mitigating
- Option: Inherent

6. Which term means to support strengthen or reinforce something?

- Option: Obscured
- Option: Bolster
- Option: Emblematic
- Option: Augmented

7. What term describes a pattern of behavior that is harmful or disruptive to others in society?

- Option: Exquisite
- Option: Antisocial
- Option: Artistry
- Option: Mortality

8. Which term means to regulate adjust or control something?



- Option: Discern
- Option: Modulate
- Option: Acquity
- Option: Vital

9. What term is used to describe something that is not clear or hidden from view?

- Option: Inherent
- Option: Obscured
- Option: Delineate
- Option: Degeneration

10. Which term means to make something greater by adding to it?

- Option: Augmented
- Option: Acquity
- Option: Vital
- Option: Mortality

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. _____ is the sharpness or keenness of thought vision or hearing.
12. _____ refers to the deterioration or weakening of something especially over time.
13. Proper nutrition is _____ for maintaining good health.
14. Her _____ talent for music became evident at a very young age.
15. The scientist studied the _____ impact of deforestation on local wildlife.
16. The government introduced new policies to reduce infant _____ rates.
17. The study focused on the _____ characteristics displayed by the new species.
18. The artist was able to _____ the intricate details of the landscape in his painting.
19. The hiker was saved by the timely administration of _____ after being bitten by a snake.
20. Regular hand washing is a simple form of _____ against the spread of infectious



diseases.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. The professor the complex theory to the students in a way that was easy to understand.
22. Communication between cells occurs through signaling molecules.
23. The bald eagle is of strength and freedom in the United States.
24. The researchers conducted a of existing studies to draw comprehensive conclusions.
25. Her talent for storytelling was and had been evident since she was a child.
26. The ability to subtle differences in color is essential for a painter.
27. The chef's culinary was evident in the beautifully presented dishes.
28. Planting more trees is a factor in reducing air pollution.
29. The jewelry was crafted with detail and precision.
30. The scientist carefully outlined the experimental before conducting the research.

Answer

Multiple Choice: 1. Elucidated 2. Pathogenesis 3. Formidable 4. Therapeutic 5. Meta-analysis 6. Bolster 7. Antisocial 8. Modulate 9. Obscured 10. Augmented

Gap-Fill: 11. Acquity 12. Degeneration 13. Vital 14. Intrinsic 15. Ecological 16. Mortality 17. Phenotypic 18. Delineate 19. Antivenom 20. Prophylaxis

Matching sentence: 1. Elucidated 2. Intercellular 3. Emblematic 4. Meta-analysis 5. Inherent 6. Discern 7. Artistry 8. Mitigating 9. Exquisite 10. Methodology

CATEGORY

1. Health - LEVEL6

Date Created

2025/01/20

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